REMARKS

Claims 1 and 3-15 are currently pending in the application. Applicants have canceled claim 2, and amended claims 1, 3-13, and 15. Claim 14 has been withdrawn by the Examiner. Applicants request reconsideration of the application in light of the following remarks.

Restriction Requirement

Applicants affirm the provisional election of Group I, claims 1-13 and 15, made during a telephone conversation on November 1, 2005. The election is made without traverse. No correction to the inventorship is required.

Rejections under 35 U.S.C. §103

To establish a *prima facie* case of obviousness under 35 U.S.C. §103, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Third, the cited prior art reference must teach or suggest all of the claim limitations. Furthermore, the suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based upon the Applicants' disclosure. A failure to meet any one of these criteria is a failure to establish a *prima facie* case of obviousness. MPEP §2143.

Claims

Claims 1-12 and 15 were rejected by the Examiner under 35 U.S.C. § 103(a) as being unpatentable over Amey et al. (U.S. Patent No. 6,409,567, hereinafter "Amey"), in view of Chuang et al. (U.S. Patent No. 6,359,383, hereinafter "Chuang"). Applicants respectfully traverse this rejection and request reconsideration of the claims.

In particular, for claim 1, Amey is relied upon for having an emitter composition, a carbon emitter, a binder, glass frit, a dispersing agent, and an organic solvent. The Examiner admits that Amey does not have: a "field emission cell", a field emission cell having "carbon nanotubes", and an emitter composition from which the field emission cell is to be formed, in which the emitter composition has a weight percent of diamond in a range from 0.1 to 20.

Since Amey lacks a "field emission cell", a field emission cell having "carbon nanotubes", and an emitter composition from which the field emission cell is to be formed, in which the emitter composition has a weight percent of diamond in a range from 0.1 to 20, the Examiner has sought to supply these features by reaching into the disclosure of Chuang. On page 4, line 11 of the Office action, the Examiner has erroneously stated that "the carbon nanotubes include diamond." While Chuang may be considered to have an emitter cell, and sharp carbon points or nanotubes, Chuang has no disclosure of an emitter composition having carbon nanotubes and a specific weight percentage of diamond within a range from 0.1 to 20. In fact, each of Chuang's disclosure of diamond lists diamond as an alternative to carbon and not as combined with carbon. (See, for example, column 6, lines 32-35 which state that the "nanotube emitter layer ... [is] formed of an electrically conductive material such as carbon, diamond, or diamond-like carbon.") Another portion of the disclosure of Chuang at column 4, lines 3-6 states that the "layer of nanotube emitter ... [is] formed of a material selected from the group consisting of carbon, diamond, and diamond-like carbon." Thus, Chuang has no disclosure of the specific, "diamond", mixed with the generic, "carbon", for the emitter composition.

Chuang does not disclose the specific range of weight percentages of diamond from 0.1 to 20. Rather, Chuang states that the "nanotube emitter layer may be formed of a carbon past that includes between 20 wt % and 80 wt % of carbon and the remainder of a solvent-containing binder." (See column 4, lines 19-21.) Thus, both Amey and Chuang lack a teaching of diamond in any range, and Chuang only provides a range of the generic carbon between 20 wt % and 80 wt %, (which excludes the low end of 20 wt % by the term "between".) Thus, claim 1 as originally presented having diamond in a range of 0.1 wt % to

20 wt % in the emitter composition is considered to be allowable over Amey and Chuang. However, an additional limitation is being added to claim 1 to further distinguish over the prior art as set forth below.

Claim 1 has been amended to include a range of weight percentages from 2 wt % to 20 wt % for the carbon nanotube in addition to the weight percentages from 0.1 wt % to 20 wt % of diamond. This recitation explicitly requires two characteristically distinct components in amounts defined by two specific weight ranges. Therefore, Amey and Chuang are even more deficient in showing or teaching the invention of claim 1, as currently amended.

The Examiner has argued that inclusion of the carbon nanaotube in the range of 2-20 wt % would have been obvious to one having ordinary skill in the art since it has been held in *In re Aller,* 105 USPQ 233 that "where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art." However, it is to be noted that the "general conditions" of claim 1, (the addition of diamond in addition to the carbon nanotube), is not provided by the prior art as set forth above, as is required by *In re Aller.*

Furthermore, the addition of diamond in combination with the carbon nanotubes in the composition of the present invention yields unexpected results as indicated by the difference in current densities of Figure 1. Applicants state on page 10, lines 18-21 that the inclusion of diamond in accordance with the present invention results in a superior current density of "about two to three times ... that of the comparative examples" of the prior art. (See also Figure 1 for the unexpected difference.) The difference is really in the realm of "difference in kind" since a different kind of result, (i.e., two to three times the current density at a common threshold voltage), is achieved. (See the curve represented by squares in Figure 1 representing the current density of the present invention as opposed to the curves represented by diamonds and circles showing the current densities achieved by the prior art devices.)

In accordance with MPEP Section 716.02 (a) II. entitled SUPERIORITY OF A PROPERTY SHARED WITH THE PRIOR ART IS EVIDENCE OF NONOBVIOUSNESS,

an unexpected superiority of a property, (current density per unit area in the present case), can provide sufficient evidence to overcome an obviousness rejection under 35 USC 103. This section states: "Evidence of unobvious or unexpected advantageous properties, such as superiority in a property the claimed compound shares with the prior art, can rebut prima facie obviousness. 'Evidence that a compound is unexpectedly superior in one of a spectrum of common properties . . . can be enough to rebut a prima facie case of obviousness.' No set number of examples of superiority is required. In re Chupp, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987)"

In this case, Applicants' disclosure of the significant difference in the significant properties including current density as set forth on page 10, lines 15-21, page 12, lines 3-9, and as illustrated by the comparative curves on the graph of Figure 1 are evidence of unexpected results. Alternatively stated, use of carbon or diamond in the prior art yielded current densities one half to one third the current densities achieved when using a compound of carbon and diamond in the emitter composition. Thus, using the combination of diamond and carbon provided a synergistic effect that was unexpected. Therefore, recitation in claim 1, which includes diamond in addition to the carbon nanotube in the emitter composition is considered to be not obvious and allowable. Indication of the same is earnestly requested.

Claim 2 has been canceled and the matter thereof incorporated into claim 1.

Claims 3-12 and 15 are considered to be allowable as being dependent on allowable base claim 1 and for additional patentable features therein as may be appreciated by the Examiner.

Claim 13 was rejected by the Examiner under 35 U.S.C. § 103(a) as being unpatentable over Amey et al. (U.S. Patent No. 6,409,567, hereinafter "Amey"), in view of Chuang et al. (U.S. Patent No. 6,359,383, hereinafter "Chuang"). Applicants respectfully traverse this rejection and request reconsideration of the claims.

The Examiner admits that Amey and Chuang do not have diamond powder with particle sizes not greater than six μm. Thus, the Examiner relies upon Eom for a disclosure of diamond powder having a particle size of less than or equal to six μm. However, the disclosure of Eom is directed principally to thin film deposits, and "spraying on" or growing the diamond for randomly occurring deposits of the diamond. Furthermore, Eom fails to disclose the diamond particles in a layer of more general carbon material. Hence, it is not clear how one would apply the teachings of Eom to the references of Amey and Chuang in order to arrive at providing the species, "diamond" particles in combination with "carbon" material applied as a thick film such as by screen printing or the like, as is done in the present invention. Therefore, claim 13 is considered to be further patentable over the references relied upon.

Applicants respectfully request that the obviousness rejections of claims 1, 3-13 and 15 be withdrawn, and that a Notice of allowance of claims 1, 3-13, and 15 be forwarded to the Applicants' representative.

Regarding Doctrine of Equivalents

Applicants hereby declare that any amendments herein that are not specifically made for the purpose of patentability are made for other purposes, such as clarification, and that no such changes shall be construed as limiting the scope of the claims or the application of the Doctrine of Equivalents.

CONCLUSION

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

It is requested that a one-month extension of time be granted for the filing of this response, and the appropriate extension filing fee of $60.00 is enclosed herewith.

If any fees, including extension of time fees or additional claims fees, are due as a result of this response, please charge Deposit Account No. 19-0513. This authorization is intended to act as a constructive petition for an extension of time, should an extension of time be needed as a result of this response. The examiner is invited to telephone the undersigned if this would in any way advance the prosecution of this case.

Respectfully submitted,

Date: March 9, 2006

By David E. Allred
David E. Allred
Reg. No. 47,254

SCHMEISER, OLSEN & WATTS LLP
18 East University Drive, #101
Mesa, AZ 85201
(480) 655-0073

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